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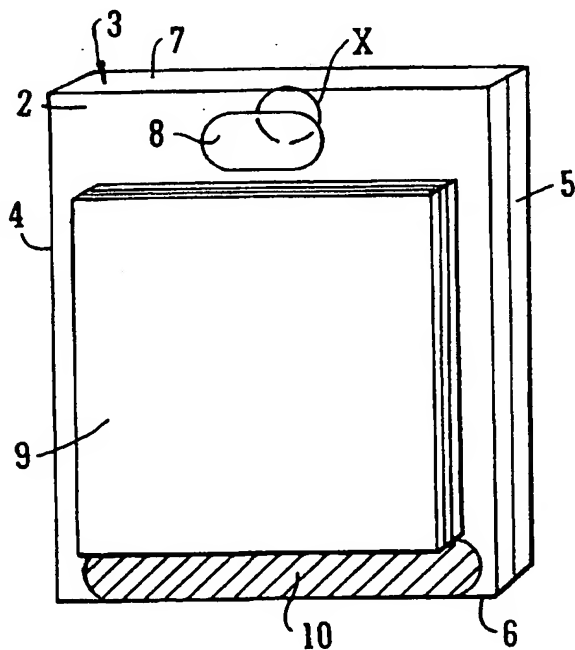
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(54) Title: FOOD CONTAINER



(57) Abstract: Container for heating food in an electrical bread toaster or other radiant heating device comprises a closed or partially open pouch formed of flexible sheet material comprising a woven fabric, such as glass or KEVLAR fibres, coated or impregnated with an electrically non-conductive heat resistant material, for example PTFE.

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**FOOD CONTAINER**

The invention relates to a container to hold food to be heated in a toaster.

A conventional toaster, with one or more upright slots and banks of radiant heaters located at either side of each toaster slot, provides rapid heating of bread and has also been used for other food items such as waffles, crumpets etc. It is known to heat food in metal foil packages in a toaster although such packages require perforation in order to cook adequately due to the impermeability of the metal foil. Such perforations are required in order that the radiant heat may enter the package and that steam produced by the heating process is allowed to exit, without which the food will not brown.

Other techniques involve metal racks, grilles, or mesh arrangements which are inserted into the toaster to hold a whole sandwich or other food together. Apart from being cumbersome, these all involve the introduction of metal objects by hand into the toaster where lethal voltages are present. There is also the problem of containment of any excess moisture from non-bread foods that will tend to drip out of the container into the toaster where it is difficult to clean.

It is one object of this invention to provide an improved container for heating food in an energised toaster.

According to the present invention in one aspect there is provided a container for heating food in a toaster, the container comprising two facing walls sealed along three edges to define a pouch having an open mouth, the walls being formed of two layers, one outside the other, the outer layer comprising an electrically non-conductive and heat resistant material, and the inner layer being a woven fabric having sufficient thermal conductivity to heat, in use, food contained in the pouch when in an energised toaster.

According to a second aspect there is provided A container for heating food in a radiant heat generating device, the container including at least one wall for receiving said radiant heat and made of a woven fabric coated and/or impregnated with an electrically non-conductive and heat resistant material, the wall having sufficient thermal conductivity to transmit said heat to food contained in the container.

It is preferred that the outer layer is polytetrafluoroethylene (PTFE) or tetrafluoroethylene (TEFLON®). It is also preferred that the inner layer is a weave of glass or poly(p-phenyleneterephthalamide) (KEVLAR®) strands. However, other materials suitable for this purpose are not excluded.

It is preferred that the container has at least one tab or handle for removing the container from the toaster.

Preferably fluid-absorbing means are present inside the container, having hydrophilic and lipophilic properties to absorb excess moisture of fats produced by the food during

heating. Such means may be attached or loosely placed within the container at its base.

Different means may be provided in order to alter the thermal conductivity of the container material. This may be necessary in circumstances where it is necessary to cook the centre of an article thoroughly, as generally the outer surface of the food cooks more quickly. The inside of the container preferably has a reflective external coating or layer of metal foil or wire. However, it is within the scope of the invention to alter the thermal conductivity of the container by varying the pigment colour of the material; for instance a white pigment will retard the heating process and a black pigment will aid the transfer of heat to the interior of the container.

The container is sized so as to fit into a slot of a toaster, and is of sufficient height to allow an adequate proportion of the container to project above the top of the toaster body in use, such that the user will not feel the heat of the container when removing it from the toaster. However, in practice removal of the container is not a problem due to the excellent thermal properties of the container material, which is cool enough to touch within seconds of ejection from the toaster.

According to the invention in another aspect there is provided a method of heating food in a toaster by adding food to a container comprising two facing walls sealed along three edges to define a pouch having an open mouth, the walls being formed of two layers, one outside the other, the outer layer comprising an electrically non-conductive and heat resistant material, and the inner layer being a woven fabric having sufficient

thermal conductivity to heat, in use, food contained in the pouch when in an energised toaster; the method comprising inserting the container into the slot of a toaster, energising the toaster for a sufficient time period for the food to be heated, and then removing the container from the toaster.

It may be desirable to seal the pouch on all sides to contain a variety of foods for storage prior to sale, in order to form a range of convenience foods. The pouch may be provided with means for manual opening such as a draw string or tear strip provided on one or more sides, ideally at the top of the pouch as supported in the toaster. Such a range of convenience foods would be ideal for sale at garages, pubs and the like, where instant heating is paramount.

The invention will now be described by way of example only with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective view of one container of the invention;

Figure 2 is a perspective view of another container of the invention;

Figure 3 is an enlarged view of a portion of the edge of one side wall of the container of Figure 2, labelled X in Figure 1;

Figure 4 is a cross section through a toaster housing the Figure 2 container;  
and

Figure 5 is a perspective view of another container.

One container of Figure 1 is made from a sheet of material comprising woven glass or KEVLAR fibre 11 is sprayed with pigmented PTFE on both sides to form outer layers 12 - the woven base material 11 cannot be seen in the actual product - a portion of one of the layers 12 is removed in Figure 2 for illustration purposes. The sheet is folded at two opposite edges and welded at a central seam 20 and a lower edge to form a pouch with two facing opposite walls 2 and 3. A slotted hole is provided at the top of each wall 2 and 3.

A sandwich, beans, bacon or even scrambled egg mix may be placed in the pouch and the pouch then placed in the bread slot of an electrical bread toaster. The radiant heat from the toaster elements then cooks or heats the contents of the pouch.

The holes 8 form handles for retrieving the pouch from the toaster. The container 1 of Figure 2 again comprises two facing walls 2,3 which are joined along three edges 4,5,6 to define a pouch, having one edge open to form a mouth 7. Below the mouth 7 of the container 1 aligned holes are formed (only one of which is visible) in both facing walls 2,3 to form a handle 8 for removal of the container 1 from a toaster. The food to be cooked is placed in the container 1. In this case, the container 1 is accommodating a cheese sandwich 9 to be toasted. Fluid absorbing material 10 is located in the bottom of the pouch to draw excess moisture and fats away from the sandwich 9 allowing it to brown.

For both Figure 1 and 2, the facing walls 2,3 of the container 1 are made up of two layers 11,12. The inner layer 11 is a woven material containing strands of a material with high thermal conductivity such as KEVLAR® (poly(p-phenyleneterephthalamide). The outer layer 12 is a coating of an electrically non-conductive and heat resistant material such as TEFLON (tetrafluoroethylene). A suitable KEVLAR® reinforced TEFLON® coated material is available commercially under the trade mark TYGAFLORE and is produced by Tygaflore Ltd.

The container 1 is generally formed from single sheet of material, by folding a strip in half and sealing the ends using heat and pressure to form a tube, and then securing one end of the tube to form a pouch.

Figure 3 shows a cross-section of a typical toaster 13 of the parallel type having two slots 14,15 and three heating elements E. A container 1 of the invention containing a sandwich 9 is seated in each of the two slots 14,15. The height of the container 1 is such that when placed into the toaster 13 the top of the facing walls 2,3 of the container 1 project from the top of the toaster body 13, providing a cool portion 16 of the container 1 to aid removal from the toaster 13 once the food 9 is cooked. The toaster is energised in the usual way, until the food is heated.

Instead of an electric bread toaster, the container of Figure 1 or 2 may be heated in alternative radiant heating apparatus, for example a grill or microwave oven of the kind having a combined radiant heater (not shown).

The invention is not limited to the embodiment shown. For example, other materials may be used to produce the container 1; all four edges 4,5,6,7 may be sealed and a tear strip or other means may be provided for opening the container; alternative handle or tab arrangements may be used; the edges may be folded prior to sealing to reduce the risk of leakage; one or more of the edges may be fixed using a clip or clamp; and the corners of the container may be radiused to permit more effective cleaning. The container may also be manufactured from two separate sheets of material forming the front and back facing walls 2,3. The material of the container 1 is flexible enough to allow the container to be turned inside out for easy cleaning either by hand or by placing over a plate prong in a dishwasher. However, it is within the scope of the invention to use a more rigid material to make the container suitable for certain uses, for example, for point of sale display of a pre-packed convenience food designed for single use and disposal.

To achieve optimum heating characteristics, the container walls could comprise PTFE which is pigmented or aluminised or a metallic foil or mesh could be incorporated (not shown).

The embodiment of Figure 5 comprises a pouch 40 comprising two flexible walls 41 and 42 sealed all round the periphery of the pouch, for example, by welding or by having a weldable tape (not shown) attached between the peripheral portions of the walls 41 and 42. The tape may be made of PFA. A portion of food 43 (for example, french fries) is enclosed in the pouch 40. The walls 41 and 42 are made of glass mesh



impregnated with PTFE (by being sprayed onto the mesh). The walls are of relatively low thickness (for example with a gauge of less than 150gm per square metre, or less than 100 or better less than 80, or even about 60 to 65 grams per square metre so that they are porous to steam emitted by the food in the pouch when heated, i.e. so they are gas permeable but do not let out appreciable liquid.

The walls 41 and 42 could be perforated to improve porosity. To hermetically seal or at least keep reasonably airtight, the food within the container 40, the latter could be supplied sealed inside an outer bag which is removed prior to heating.

In all the embodiments, the container walls could be connected together by a means other than welding, for example by stitching or by a clip or clamp device (not shown)

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**CLAIMS**

1. A container for heating food in a radiant heat generating device, the container including at least one wall for receiving said radiant heat and made of a woven fabric coated and/or impregnated with an electrically non-conductive and heat resistant material, the wall having sufficient thermal conductivity to transmit said heat to food contained in the container.
2. A container for heating food in a toaster, the container comprising two facing walls sealed along three edges to define a pouch having an open mouth, the walls being formed of two layers, one outside the other, the outer layer comprising an electrically non-conductive and heat resistant material, and the inner layer being a woven fabric having sufficient thermal conductivity to heat, in use, food contained in the pouch when in an energised toaster.
3. A container according to Claim 1 or 2, wherein the electrically non-conductive heat resistant material is polytetrafluoroethylene or tetrafluoroethylene.
4. A container according to Claim 1 or 2, wherein the woven fabric is a weave of glass or poly(p-phenyleneterephthalamide) strands.
5. A container according to any preceding Claim, wherein the container has at least one tab or handle for facilitating removal of the container from the device.

6. A container according to any preceding Claim, wherein fluid-absorbing means is present inside the container, having hydrophilic and lipophilic properties to absorb excess moisture or fats produced by the food during heating.
7. A container according to any preceding Claim, wherein the container has a reflective external coating or layer of metal foil or wire.
8. A container according to claim 1, adapted for being received in a bread slice receiving slot of an electric bread toaster.
9. A container according to any preceding claim, wherein the container comprises two walls made of said woven fabric coated or impregnated with said electrically non-conductive material.
10. A container according to Claim 9, wherein said two walls are formed as a pouch sealed all around the periphery of the pouch and said walls are porous.
11. A container according to Claim 9, wherein said two walls are formed as a pouch sealed around a part of the periphery of the pouch to leave an open mouth for receiving said food.
12. A method of heating food in a radiant heat applying device, by adding food to a container comprising two facing walls sealed along three edges to define a pouch having an open mouth, the walls being formed of two layers, one outside the

other, the outer layer comprising an electrically non-conductive and heat resistant material, and the inner layer being a woven fabric having sufficient thermal conductivity to heat, in use, food contained in the pouch when in an energised heating device; the method comprising inserting the container into the device, energising the device for a sufficient period of time for the food to be heated and then removing the container from the device.

13. A method of heating food in a radiant heat applying device by taking a container which contains said food and comprises at least one wall and which is in the form of a sealed pouch which contains said food, said wall being porous and comprising an electrically non-conductive and heat resistant material, coated onto or impregnated into a woven fabric having sufficient thermal conductivity to heat in use food contained in the pouch when in an energised device, the method comprising inserting the container into the device energising the device for a sufficient period of time for the food to be heated and then removing the container from the device.
14. A method according to Claim 12 or 13, wherein said device is an electrical bread toaster.

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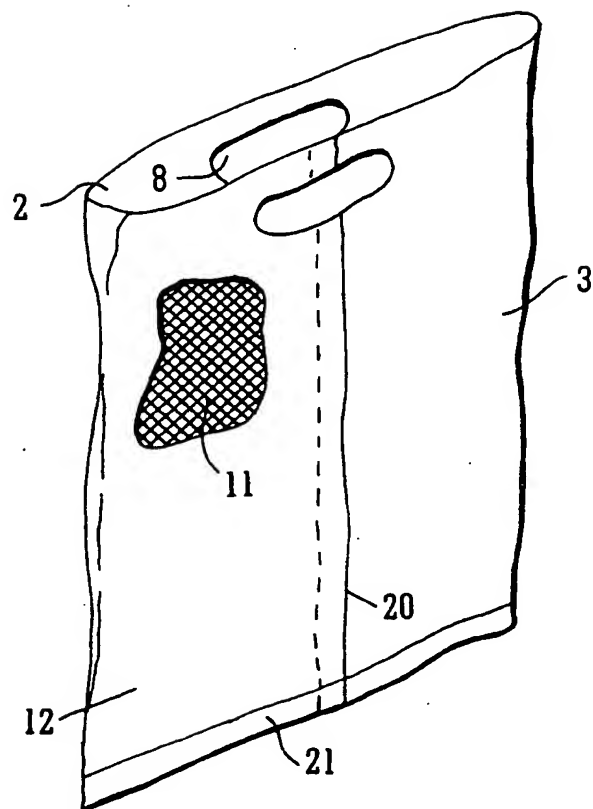


FIG. 1

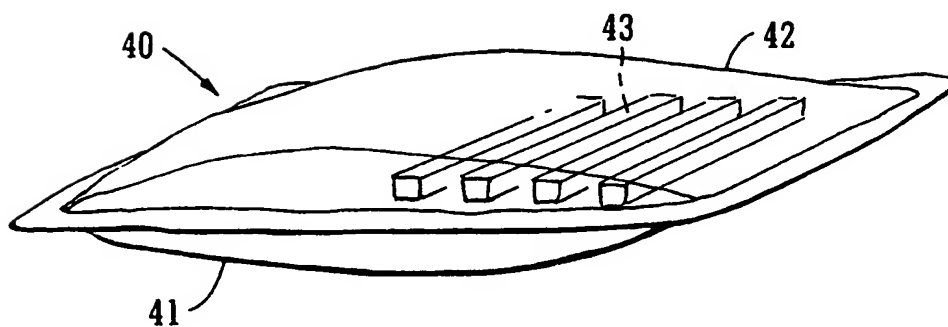


FIG. 5

2/2

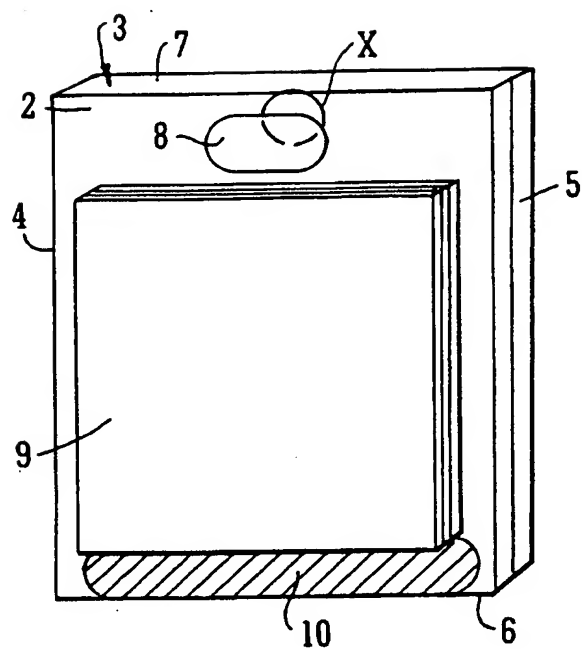


FIG. 2

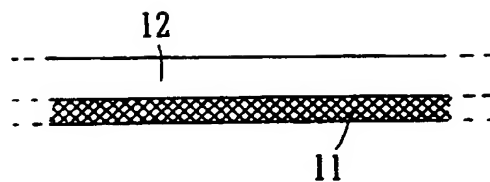


FIG. 3

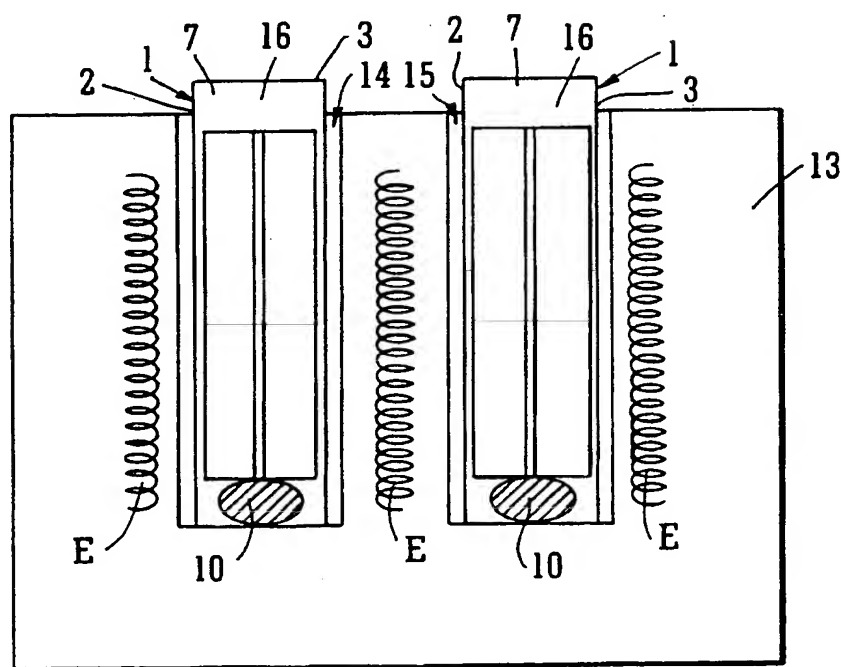


FIG. 4

SUBSTITUTE SHEET (RULE 26)

# INTERNATIONAL SEARCH REPORT

Internat'l Application No  
PCT/GB 00/02409

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B65D75/26 B65D81/34

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 891 775 A (MURRAY EDWARD J ET AL) 24 June 1975 (1975-06-24) column 2, last paragraph -column 4, line 7; figure 1	1-5,8, 11,12,14 10,13
A	----- Y EP 0 903 099 A (FORMCOOK AB) 24 March 1999 (1999-03-24) paragraphs '0017!-'0019!	1-5,8, 11,12,14
A	----- GB 1 374 937 A (TOYO SEIKAN KAISHA LTD) 20 November 1974 (1974-11-20) page 1, line 87 -page 2, line 57; figure 6	2,7,11, 12
A	----- US 5 853 781 A (YEE DEBORAH J ET AL) 29 December 1998 (1998-12-29) column 2, line 16 - line 22 ----- -/--	6

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 00/02409

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 554 770 A (LIPSKY MARCUS ET AL) 12 January 1971 (1971-01-12) column 1, line 14 - line 44 ---	9
A	EP 0 240 071 A (UNILEVER PLC ;UNILEVER NV (NL)) 7 October 1987 (1987-10-07) column 1, line 1 - line 16 -----	10,13



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02409

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3891775	A	24-06-1975	NONE	
EP 0903099	A	24-03-1999	US 5951895 A DE 903099 T ES 2133259 T	14-09-1999 09-12-1999 16-09-1999
GB 1374937	A	20-11-1974	NONE	
US 5853781	A	29-12-1998	NONE	
US 3554770	A	12-01-1971	BE 672454 A DE 1486600 A DK 113909 B GB 1128929 A NL 6514684 A SE 303451 B	16-03-1966 10-07-1969 05-05-1969 18-05-1966 26-08-1968
EP 0240071	A	07-10-1987	AT 53366 T CA 1290289 A DE 3763056 D GR 3000538 T JP 62251366 A	15-06-1990 08-10-1991 12-07-1990 31-07-1991 02-11-1987